

## IN THE CLAIMS

1. **(original)** A method for nuclear magnetic resonance (NMR) logging of a geologic formation comprising the steps of:
  - a. providing a plurality of NMR measurements over a depth interval of the geologic formation;
  - b. computing from the NMR measurements a plurality of porosity values corresponding to the depth interval of the geologic formation;
  - c. processing the computed porosity values to detect abnormal formation pressure in a zone within the depth interval.
2. **(original)** The method of claim 1, wherein the NMR measurements data is obtained from a logging-while-drilling NMR tool.
3. **(original)** The method of claim 2, wherein the plurality of porosity values are obtained from one or more NMR  $T_1$  relaxation curves.
4. **(original)** The method of claim 1, wherein the depth interval of the geologic formation is dimensioned to contain multiple zones, including at least one normally pressured zone.
5. **(original)** The method of claim 3, wherein the one or more  $T_1$  relaxation curves is processed to extract the dominant  $T_1$  relaxation modes, and the method further comprises providing estimates of the amounts of clay-bound water, free water, and hydrocarbons.
6. **(original)** The method of claim 1, wherein the provided plurality of NMR measurements comprises one or both of  $T_1$  and  $T_2$  NMR measurements.
7. **(original)** The method of claim 6 further comprising the step of obtaining at least one of electric, acoustic, and nuclear log data, and plotting the data as a function of depth to provide a normal compaction trend.
8. **(original)** The method of claim 1, wherein NMR measurement data is collected by applying a saturation pulse and a readout sequence applied after a timed recovery delay.
9. **(original)** The method of claim 8, wherein the time between applying a readout sequence and measuring an echo signal is about 0.5 ms.
10. **(original)** The method of claim 8, wherein the recovery delay varies between about 1 and at least about 30 ms.

11. **(original)** The method of claim 8, wherein the recovery delay varies between about 1 and at least about 1000 ms.
12. **(original)** The method of claim 1, wherein an abnormally pressured zone is determined using NMR  $T_1$ -derived clay-bound water porosity and porosity versus pore pressure correlation information.
13. **(original)** The method of claim 12, wherein the pressure within the abnormally pressured zone is determined using  $T_1$ -derived porosity and Eaton's pressure analysis method.
14. **(original)** The method of claim 1, wherein calculating clay-bound water using NMR is performed according to a fixed cutoff method.
15. **(original)** A method for nuclear magnetic resonance (NMR) logging of a geologic formation comprising the steps of:
  - a. lowering a NMR logging tool into a borehole;
  - b. conducting NMR measurements of at least two zones of the geologic formation, the measurements comprising either a  $T_1$  or  $T_2$  relaxation spectra or a combination thereof;
  - c. estimating clay-bound water volumes associated with the at least two zones of the geologic formation;
  - d. processing the estimated clay-bound water volumes to detect abnormal formation pressure.
16. **(original)** The method of claim 15, wherein steps (a)-(d) are performed while drilling the borehole.
17. **(original)** The method of claim 15, wherein an indication of an abnormal pressure in a borehole zone is provided to a human operator.
18. **(original)** The method of claim 15 further comprising the step of determining a normal compaction trend.
19. **(original)** An apparatus for nuclear magnetic resonance (NMR) logging of a geologic formation comprising:
  - a. means for providing a plurality of NMR measurements over a depth interval of the geologic formation;

- b. means for computing from the NMR measurements a plurality of porosity values corresponding to the depth interval of the geologic formation; and
  - c. means for processing the computed porosity values to detect abnormal formation pressure in a zone within the depth interval.
20. **(original)** The apparatus of claim 19, wherein the means for providing a plurality of NMR measurements comprises an NMR logging while drilling tool.
21. **(original)** The apparatus of claim 19, wherein the NMR measurements comprise either a  $T_1$  or  $T_2$  relaxation spectra or a combination thereof.